The Defense Program and Labor Requirements

By Edward O. Bassett

THE prompt and complete fulfillment of defense labor needs is one of the important problems now facing the administrators of the defense program. Success in achieving the rapid increase of aircraft, ship, and ordnance production planned for the remaining months of 1941 and throughout 1942 will make necessary large additions to working forces in these and other industries. Moreover, the whole process of expansion ordinarily involves a rising demand for civilian consumers goods, which in turn expands employment in those lines. Whether such civilian expansion can continue in the aggregate throughout the winter, or will be halted, either because of material or labor shortages, is one aspect of the defense picture that must be clarified.

Among the factors that will shape the answer are the size of the over-all labor force available and the proportion of this force that is still unemployed. But such an over-all picture, of course, is not enough. Defense industries require a large number of highly skilled workmen as do certain civilian lines. So a further inquiry must be made into the needs for these skills and the possibilities of meeting them.

The administrative agencies of the Government have launched investigations regarding these questions, and while no definitive answers can yet be advanced and the magnitude of the defense effort grows daily, it is possible at this time to sketch in broad outline the picture of labor requirements and supply.

Defense Employment Requirements.

In the national emergency, defense has been given first call upon the labor force; labor priorities will be invoked if necessary to insure that enough workers are available to fill every defense job. Defense employment, after the first year, is already substantial. How many more workers will be required?

The defense program is a vast and rapidly growing national enterprise. In manufacturing, it comprises five principal divisions: aircraft, ship fabrication and repair, ordnance, Quartermaster supply, and machinery and machine tools. In the field of construction, new factories, warehouses, docks, airfields and hangars, Army camps and dwellings for defense workers are being built. Underlying both final assemblies of aircraft, ships, etc., and on-site construction work, are the production of materials and the fabrication of parts. In addition to manufacturing, mining, and construction, defense also makes important demands upon ocean and inland transportation, and upon the power industry. Defense expenditures already are at a rate in excess of 14 billion dollars yearly, and this rate will probably be doubled within a year. Appropriations to date (plus 3.7 billion dollars of British orders) total 60 billion dollars, and probably close to two-thirds of this will be spent before the end of 1942.

Defense employment through June 1941 is shown, so far as the available information permits, in table 1. Unfortunately, the statistical record is incomplete, and does not afford a satisfactory basis for appraising either present defense employment or future requirements. In the main, the data represent only direct employment, such as that on final assembly, omitting with a few exceptions, such as iron and steel, the important field of indirect employment.[1] Moreover, many

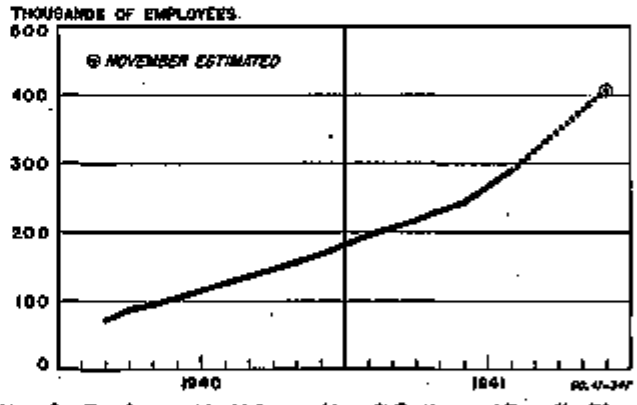

Figure 8.—Employment in Airframe, Aircraft Engine, and Propeller Plants, End of Month, February 1940–July 1941, and November 1941 (U. S. Bureau of Labor Statistics, Defense Labor Requirements Division).

NOTE.—Data represent employment in final assembly plants producing airframes, engines, and propellers for military and naval aircraft, and commercial transport planes, but exclude employment by subcontractors. The November 1941 employment requirements were estimated on the basis of contracts approximating 4 billion dollars.

of the so-called defense industries, including iron and steel, brass, bronze and copper products, optical goods, instruments, etc., are not engaged exclusively on defense work.

A more comprehensive picture of defense employment is given in an estimate by the United States Bureau of Labor Statistics that through June this year approximately 2.6 million new defense workers

[1] The distinction between direct employment and indirect employment is largely a matter of statistical convenience. Direct employment represents workers in final assembly plants, but does not exclude employment in the production of materials and parts in these plants, and workers at the site of construction. Indirect employment is the "all other" classification, including the employment of subcontractors (except in construction, where all work at the construction site is direct employment), other producers of purchased materials and parts, imputed employment in transportation, etc. Indirect employment is, in general, extremely difficult to trace. The ratio between direct and indirect employment varies widely among different industries, but in the case of many defense industries indirect employment appears to be more important than direct employment.

(out of a total increase of 3.7 million in nonagricultural employment) had been added to the 400,000 employed in the production of military aircraft, naval vessels, and other war materials during the second quarter of 1940. Those engaged directly or indirectly in defense work thus approximated 3 millions in June, and this total doubtlessly has been increased (to the end of August) by at least 200,000 or 300,000 more.

Employment requirements—the number of workers that must be added in order to attain scheduled levels of output—have been estimated in detail only for certain industries constituting a part of the defense program. Figures 8 and 9 portray two such estimates. Employment in the aircraft industry, which at the end of July approximated 291,000, will need to exceed 413,000 by November this year. To this increase in the employment requirements of final assembly plants, as shown in figure 8, should be added 51,000 additional workers needed by subcontractors producing parts and subassemblies, while aircraft instrument and accessory plants will also need 10,000 or 15,000 new workers. By early 1942, additional orders under Lease-Lend, the "3600 bomber" program, and new engine plants are expected to raise total requirements (exclusive of those producing the raw materials, transport, etc.) to about 860,000 workers, more than twice present employment. Before the end of next year a further advance to well above 1 million is possible.

Similar expansion in working forces is also indicated at Navy and private shipyards (figure 9), with 558,000 needed by January, and about 626,000 necessary to meet peak requirements in September 1942. July 1941 shipyard employment was 348,000 workers. These figures again do not give effect to substantial indirect employment outside of shipyards in the production of materials and equipment for new ships and ship repairs.

Other estimates have been made of direct employment requirements in the production of machine tools and ordnance, and in miscellaneous defense manufacturing (excluding Quartermaster supply). Increasing machine tools and ordnance production, it is indicated, will call for between 250,000 and 300,000 new workers by next April or May, while 350,000 to 400,000 addi-

Table 1.—Employment in Selected Defense Industries and Agencies, June 1940–July 1941

	June 1940	June 1941	July 1941	Increase June 1940 to July 1941	
				Number	Percent
Defense manufacturing, selected industries and agencies, total	1,702,100	2,611,600	2,712,700	1,010,600	59.4
Aircraft (airframes, engines, and propellers)[1]	115,800	264,500	290,700	175,400	152.1
Shipyards, Navy and private	159,400	329,000	348,400	189,000	118.6
Federal shipbuilding program	93,700	178,100	180,800	80,600	92.4
War and Navy Department manufacturing, exclusive of Navy shipyards	26,900	65,500	69,000	29,700	114.7
Firearms, ammunition, and explosives	20,600	[2] 35,600	[2] 35,000	[2] 14,400	[2] 71.2
Machine tools and machine-tool accessories	96,700	161,800	165,000	68,300	67.6
Foundry and machine-shop products	355,200	456,900	469,600	164,400	47.0
Electrical machinery, apparatus, and supplies	220,700	362,800	363,800	194,100	88.4
Blast furnaces, steel works, and rolling mills	464,800	496,200	598,200	133,700	28.8
Seven other defense industries[3]	202,800	291,200	295,200	92,000	45.7

	July 1940	February 1941	July 1941
Defense construction, total[4]	12,000	583,500	425,400
Building construction, total[5]	8,600	527,300	354,900
Barracks, cantonment camps, troop housing		380,200	47,600
Factories, shipways, dry docks, and shipbuilding facilities		82,300	172,000
Low-rent housing projects		18,000	61,000
Other defense buildings		52,300	64,300
Aviation facilities	3,400	46,300	47,200
Electrification, streets, roads, water, sewerage, and miscellaneous		6,600	5,300
Work Projects Administration (defense projects only)[6]		463,151	381,140
Construction		425,700	280,502
Vocational training		30,944	39,590
Other non construction		6,507	31,045

	June 1940	June 1941	July 1941	Increase June 1940 to July 1941	
				Number	Percent
Other defense employment: War Department, Navy Department, and Office of Emergency Management (including subsidiary and predecessor defense agencies)[7]	102,135	308,689	304,143	201,208	196.5

[1] Total employment in final assembly plants only; compiled by Defense Labor Requirements Division, U. S. Bureau of Labor Statistics.
[2] March 1941 data, the latest available.
[3] Screw-machine products; abrasive wheels; instruments—professional, scientific, and commercial; optical goods; aluminum manufactures; brass, bronze, and copper products; and smelting and refining—copper, lead, and zinc.
[4] Defense contract construction and force-account construction financed wholly or in part from Federal funds, including Federal agency construction projects financed from Work Projects Administration funds, but not defense construction projects operated by the Work Projects Administration. Construction under Certificates of Necessity not included if wholly financed from private funds. July 1940 data and February 1941 totals for all defense construction and building construction revised; detail for February 1941, which does not add to the revised totals shown, and subsequent data subject to revision.
[5] Data exclude employment on defense construction projects financed from Work Projects Administration funds but operated by other Federal agencies. No Work Projects Administration projects were classified as defense in July 1940. Data compiled by the Division of Statistics, Work Projects Administration.
[6] Civilian personnel exclusive of force-account manufacturing and construction. Numerous Federal employees in other departments and agencies are also engaged in administrative defense work.

Source: Bureau of Labor Statistics, U. S. Department of Labor, except as otherwise noted.

tional workers will be needed for other defense manufacturing (including some production of materials and parts in new plants being constructed for that purpose under Certificates of Necessity).[2]

Employment in defense construction, unlike defense manufacturing, reached a peak of 684,000 [3] in February, and will continue to decline (barring another large cantonment program) as camps and other improvements begun for the War Department last autumn and winter are completed. Recent increases in the number of workers engaged in the construction of factories, shipways and other shipbuilding facilities, and defense housing, however, will be extended in coming months.

A complete statement of defense employment requirements this year and next cannot be offered at the present time on an industry-by-industry basis. Many of the industry estimates are still quite preliminary, particularly as regards ordnance and miscellaneous de-

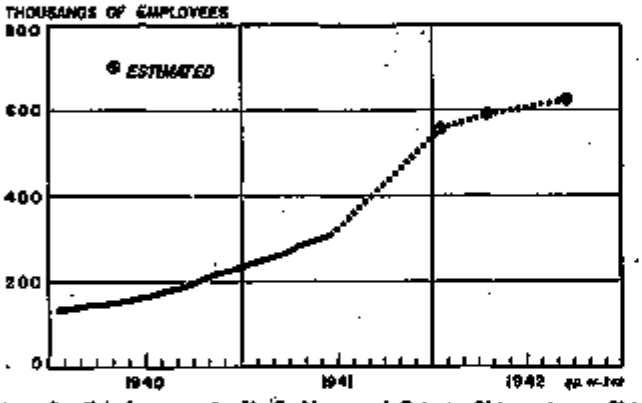

Figure 9.—Employment in U. S. Navy and Private Shipyards on Ship Construction and Repairs, January 1940–June 1941 and January, April, and September 1942 (U. S. Bureau of Labor Statistics, Division of Construction and Public Employment).

NOTE.—January, April, and September 1942 data were estimated on the basis of contracts awarded and force-account work started through June 1941, approximating $6,000,000,000. The figures reflect the increase in employment required for scheduled completions of new ships and for maintenance and repairs.

fense manufactures, while important gaps remain in the coverage of indirect employment requirements. Sufficient information is already available, nonetheless, to suggest that (as estimated by the United States Bureau of Labor Statistics) roughly 3,000,000 workers in addition to those now employed may be needed for defense output in the second half of 1942, when defense expenditures are expected to exceed 2 billion dollars monthly. Not all of these will be new workers; some proportion—perhaps a substantial part—may be diverted from nondefense industries, or devote a larger share of their working time to defense. In the consumers durable goods industries, possibly also to some extent in the metal industries now turning out producers durable goods not essential to defense, in mining, transportation and electric power, the shift of labor as well as industrial facilities from nondefense to defense, just now getting under way, doubtlessly will assume steadily increasing importance.

Nondefense Employment Needs Restricted.

Industrial employment gains amounting to over 3,800,000 from June 1940 through July of this year as shown in table 2, have not been confined to defense production. The stimulus of rising defense pay rolls has been communicated not only to industries producing consumer goods (especially consumer durables) but also to nondefense construction, trade, and the service industries. As indicated above, this process of broad economic expansion would be expected to continue as the tempo of defense is further increased, and as a consequence, substantial numbers of additional workers would be needed in the nondefense industries. Certain of the latter, however—principally consumers durable goods industries—face the prospect of restriction or curtailment, in order to conserve raw materials and release plant capacity for defense. (The part which labor shortages may play in causing the curtailment of nondefense industries is discussed in a subsequent section.)

Table 2.—Estimated Total Nonagricultural Employment, June 1940 and July 1941

(In thousands)

	June 1940	July 1941	Increase or decrease	
			Number	Percent
Total civil nonagricultural employment [1] [2]	35,425	39,241	3,816	10.8
Employees of nonagricultural establishments [1] [2]	29,382	33,096	3,815	13.0
Manufacturing—wage earners [1]	8,138	10,309	2,171	26.7
Durable goods industries [2]	3,843	5,330	1,487	38.7
Iron and steel	929	1,264	368	39.7
Machinery	1,019	1,528	509	49.9
Transportation equipment	644	1,010	366	56.8
Automobiles	422	513	91	21.6
Nonferrous metals and products	268	358	92	34.3
Lumber and products	622	725	103	16.6
Stone, clay, and glass products	201	249	48	19.9
Nondurable goods industries [1]	4,295	4,979	704	16.4
Textiles and their products	1,527	1,845	318	20.8
Leather and its manufactures	281	327	46	16.4
Food and kindred products	963	900	96	11.4
Tobacco manufactures	90	91	1	1.1
Paper and printing	628	653	45	7.1
Petroleum refining	90	93	3	3.3
Chemical and coal products (other than petroleum refining)	315	376	61	19.4
Rubber products	112	150	38	33.9
Mining	839	887	49	5.8
Contract construction	1,321	1,877	556	42.1
Transportation and public utilities	3,032	3,293	261	8.6
Trade	6,284	6,503	249	4.0
Finance, service, and miscellaneous	4,214	4,391	177	4.2
Federal, State, and local government	3,739	4,162	303	9.8
Military and naval forces (not included above)	474	1,857	1,383	291.8

[1] All employment data exclude persons employed on W. P. A. and N. Y. A. projects and enrollees of C. C. C. camps. Proprietors, firm members, self-employed persons, casual workers, and domestic servants are included in total civil nonagricultural employment, but excluded from the number of employees of nonagricultural establishments.

[2] Includes allowance for adjustment of factory wage earner totals to preliminary 1939 Census of Manufactures; the industry groups shown in this table have not been so adjusted.

Source: Bureau of Labor Statistics, U. S. Department of Labor.

How extensive will such curtailment need to be? Will the curtailment of selected nondefense industries only serve to redirect consumption into free channels, or

[2] For estimates by the U. S. Bureau of Labor Statistics, relating to the 12 months from April 1941 to April 1942, see table 3.

[3] Including Federal agency defense construction projects financed from Work Projects Administration funds, but not defense construction projects operated by the Work Projects Administration (which differ from other defense construction as to earnings, hours and type of work). Peak employment on the latter, also in February 1941, was 426,000.

will it restrict the aggregate below what it otherwise would be? Upon answers to such questions nondefense employment requirements depend. The larger the proportion of consumer expenditures barred from the purchase of curtailed consumer goods that is diverted to savings, the greater will be the retarding effect upon further expansion in nondefense industries. It seems probable that the tendency to save rather than spend upon other goods and services, is strongest where the consumption cut-off is in the form of durable goods. These are the lines most subject to curtailment, because they compete closely with defense industries for materials, production capacity, and labor skills.

If a program were put into effect cutting automobiles, refrigerators, and other principal consumers durable goods output 50 percent, expenditures on these items next year would be approximately 3 billion dollars less than those made this year. Moreover, some curtailment of other durable goods will be brought about auto-

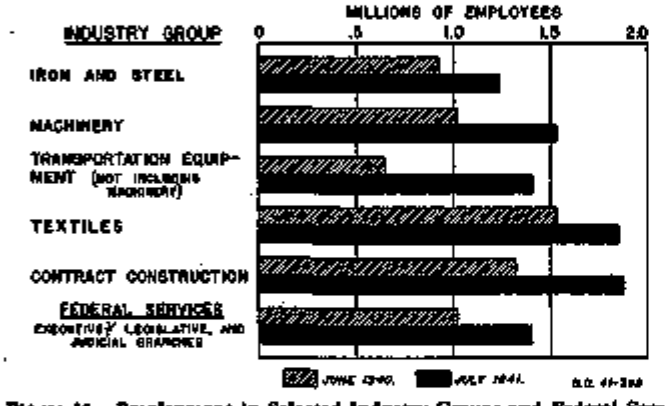

Figure 16.—Employment in Selected Industry Groups and Federal Services, June 1940 and July 1941 (U. S. Department of Labor).

[1] Includes the administrative personnel of Federal Departments and Agencies, and force-account employment in Navy shipyards, in other manufacturing establishments of the War and Navy Departments, and on Federal agency construction projects exclusive of projects operated and financed by the W. P. A.

matically by operation of the priorities system itself. At this time, it is impossible to determine with any accuracy the magnitude of the total curtailment in all consumer lines. However, it is thought that it will be such as to offset a substantial proportion of the increase in consumer expenditures that would normally occur with an expansion in employment and income of the size anticipated. Thus, only a moderate rise, if any, in nondefense employment requirements should be expected over the coming 12 to 18 months.

Unemployed Labor Force.

The curtailment of consumers durable goods industries might prove to be less restrictive of nondefense employment than suggested above. However, the present number of unemployed, together with possible additions to the labor force of persons not now seeking employment, appears adequate both to satisfy defense requirements and at the same time to provide workers for some further expansion of nondefense activities.

Unemployment in July 1941 approximated 5.6 millions, the Work Projects Administration estimates on the basis of its monthly survey. However, the labor force probably can be expanded, under extraordinary conditions of demand for labor, to include several million potential workers not currently counted as actually seeking employment. Considerable numbers of women, retired workers, and young persons, not normally working or seeking work, may be induced to do so by attractive wages and conditions of employment.

A further important qualification of the unemployment estimate has to do with the employment data. It is possible that a very large number of workers—perhaps more than a million—engaged in agriculture as subsistence farmers and family workers (and so counted as employed) but not actually necessary to the agricultural economy, and continuing in their present status because lacking employment opportunities, could be shifted to nonagricultural establishments. A similar possibility is believed to exist also in the case of many self-employed, casual workers, and domestic servants. A contrary consideration—of less quantitative importance—is that approximately 357,000 Work Projects Administration workers, who are counted as unemployed, are actually employed at present on projects related to defense.[1]

Although unemployment, as such, is estimated at no more than 5.6 millions, the number of persons available for industrial employment, especially under conditions of national emergency, probably approaches, on a rough calculation, nearer 10 millions. Special allowance must be made, however, for a probable further increase in military and naval forces. An expansion of these to a possible 4 millions would withdraw another 2.1 millions either from present employment, the unemployed labor force, or potential additions to the latter. The significance of this is evident, when it is considered that many of the young men involved, though perhaps lacking industrial experience, nevertheless are excellent worker material for new defense industries, possessing, in special degree, regional mobility and capacity for rapid training and quick assimilation of occupational semiskills (see Job-Breakdown and Worker Training below).

Problem of Occupational Skills.

Not all of the unemployed, however—in fact, as suggested below, probably only a relatively small proportion—are immediately employable in terms of the productive tasks which they might be called upon to perform. Defense industries, and in somewhat lesser

[1] Labor force and unemployment estimates assume that all persons seeking work are equally employable. There are, of course, a number of factors which actually make for considerable differences in employability, including age, physical condition, degree of skill, duration of unemployment, sex, race, etc. Some unemployed persons are certainly less employable than others. In extreme instances, such persons are likely to obtain employment only when the available supply of workers is quite meager, then perhaps only in certain (non-factory) fields of employment and for relatively brief periods. These least employable workers may be described as "unemployable." However, there appears to be no basis of demarcation between "employables" and "unemployables" which is not subject to change with the improvement of economic conditions. For this reason, as well as because of meager information about the personal characteristics of the unemployed, it is difficult, if not impossible, to estimate the proportion of the unemployed labor force which is "unemployable."

degree nondefense industries, need large numbers of workers possessing specific occupational skills and semiskills. The requirements of defense industries as to occupation and degree of skill are illustrated in table 3. It is possible immediately to satisfy such requirements by drawing upon the unemployed labor force only insofar as the unemployed can offer the occupational skills or semiskills involved.

Table 3.—Estimated Number of Additional Workers in Selected Occupational Groups Required by the Aircraft, Shipbuilding, Machine Tools, Ordnance, and Other Defense Manufacturing Industries, April 1941–April 1942[1]

Occupational group	Aircraft	Shipbuilding	Machine tools and ordnance	Total, including other defense manufacturing
Professional—engineers, draftsmen, etc.	32,700	33,400	14,600	91,200
Skilled occupations	147,000	155,500	113,700	550,900
Assemblers			23,300	38,700
Foremen	24,500	13,000	11,700	64,500
Grinder operators	20,400		8,700	30,900
Machinists (boring mill, engine lathe, milling machine, etc.)	15,850	35,500	37,900	150,500
Sheet metal workers	10,300	13,000		85,700
Tool and die makers	8,200	1,000	10,200	27,000
Semiskilled occupations	167,400	71,200	119,800	538,000
Assemblers (erectors)	65,300	6,500	29,200	138,400
Drill press operators	20,400		11,700	47,500
Machine operators, miscellaneous	8,200		23,100	90,200
Polishers	10,200		2,600	17,000
Riveters	22,600			32,400
Unskilled workers	61,300	54,300	43,700	227,500
Total requirements	408,400	323,100	291,600	1,402,600
Percent of required workers—				
Professional	8	10	5	7
Skilled occupations	36	48	39	39
Semiskilled occupations	41	23	41	38
Unskilled	15	20	15	16

[1] Other defense manufacturing excludes the production of items for the Quartermaster Corps. The estimates do not include employment necessary for transportation, power, or the extraction and fabrication of many of the materials and parts for defense products. However, employment requirements in new materials and parts plants being established under Certificates of Necessity are included.

Source: Bureau of Labor Statistics, U. S. Department of Labor.

The evidence as to how many unemployed persons are prepared to take places as skilled or semiskilled workers in defense plants is inconclusive, but suggests that the number is certainly not large, and probably far short of requirements. Out of 5 million active registrations on file with the United States Employment Service in mid-May, there were in more than 400 selected skilled and semiskilled occupations essential in defense manufacturing altogether only about 115,000 registrants, classified as to primary qualifications, available for immediate placement or after completing brief training courses in which they were then enrolled. Moreover, the prevalence of overtime in defense industries, as indicated by the average-hours data in table 4,[5] points to the difficulty of hiring additional skilled and semiskilled workers, despite the extent of unemployment.[6]

[5] Average-hours data, however, tend to understate the amount of overtime. Industries averaging 40 hours or less for all employees, may nevertheless employ some workers more than 40 hours, offset by others working less than 40 hours. The average hours of overtime per overtime worker, moreover, tend to be greater than the excess over 40 hours shown in the average hours of all workers.

The scarcity of skilled and semiskilled workers for defense plants may, in some instances, be confined to a particular locality or region, and can then be removed through the migration of unemployed workers from other areas, or through subcontracting. If, however, the lack of specific occupational skills adapted to defense manufacturing is, in fact, a comparatively general characteristic of the unemployed labor force, the problem is, of course, far more serious, and substantial shortages of skilled and semiskilled labor may readily develop as defense schedules are increased this year and next.

Table 4.—Number of Wage Earners, Average Weekly Hours, and Equivalent 40-Hour Employment in Selected Manufacturing Industries, June 1941

Industry	Number of wage earners June 1941	Average weekly hours June 1941	Additional wage earners required if all wage earners worked 40 hours weekly	
			Number	Percent of June 1941 employment
All durable goods industries	5,201,200	43.1	403,100	7.8
Aircraft and parts	188,500	45.0	22,400	12.5
Shipbuilding (private shipyards only)	182,000	45.2	23,700	13.0
Iron and steel products, other than blast furnaces, steel works, and rolling mills	628,900	42.9	45,600	7.3
Electrical machinery	353,400	43.9	24,400	6.9
Foundry and machine shop products	595,300	43.0	93,300	15.6
Machine tools	65,600	52.0	28,700	30.0
Machine tool accessories	58,000	[1] 53.2	14,200	25.5
Cash registers, typewriters, etc.	43,400	46.6	6,000	13.8
Textile machinery and parts	31,000	46.8	5,400	17.0
Aluminum manufactures	34,600	42.2	1,900	5.5
Brass, bronze, and copper products	129,400	44.7	14,500	11.2
Abrasive wheels	14,000	[1] 44.7	1,600	11.2
Instruments—professional, scientific, and commercial	32,900	[1] 46.5	5,200	16.9

[1] Data for these industries are not published currently by the Bureau of Labor Statistics.

Source: Bureau of Labor Statistics, U. S. Department of Labor.

Some relief will, of course, be afforded by the curtailment of nondefense industries. Where methods of manufacture and occupational skills are sufficiently related, it will be practical to absorb released workers into defense plants, or achieve the same result through a greater use of subcontracting. Marked similarities exist between the occupational characteristics of workers in consumers durable goods industries and those required in defense industries. The restrictions upon consumers durable goods now in effect, under discussion, or indirectly imposed by priority action, have apparently been due principally to actual or impending shortages of materials and plant capacities. However, in the event of labor shortages impeding defense, labor priorities also doubtless would be directed against consumers durable goods and such other nondefense industries as may likewise show occupational similarities to defense labor requirements.

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[6] The existence of overtime is subject to several interpretations. Besides suggesting the scarcity of suitable new workers, it may also be an important indication of shortages in plant equipment, when as an alternative to enlarging facilities or adding employees in a second (or third) shift, workers are asked to put in extra hours, particularly in "bottleneck departments."

Significance of the Outlook.

The foregoing review of supply conditions in some of the major consumer goods industries has by no means covered all the cases where shortages may, in varying degree, be felt. Raw material supply and transportation difficulties in the furniture industry may have restrictive effects even if no formal curtailment program is adopted. Almost all consumer goods requiring metal, rubber, or plastics—cameras, toys, hardware, cutlery, musical instruments, clocks and watches, and coin phonograph boxes—are likely to feel the effects of material shortages.

Second to actual output curtailment for many durable goods, the fact that stands out most sharply in a review of the general supply picture at the present time is the recurrent indication that, because of limited materials or limited capacities, expansion of supplies of consumers' goods generally is becoming increasingly difficult. One transportation bottleneck is already hampering the use of a major form of consumer transportation equipment—passenger automobiles. Supplies of apparel, though not likely to be reduced (except silk hosiery), cannot be expanded anywhere near as much from present levels as was possible a year ago; output of certain textiles can scarcely be expanded at all. Total food supplies are increasing, but total demand is increasing even more. Under the general tendency for increased demand to outrun increased supply, conditions of apparent scarcity are entirely possible, since scarcity is at all times a relative concept.

The general tendency in industry after industry toward inadequacy of supply to meet demand suggests a number of possible conclusions. One is that the need for expansion of productive capacity in a wide range of industries is very great. Moreover, where inventories of scarce raw materials are unequally distributed, some better allocation may be made. A second conclusion is that systematic efforts should be made to teach consumers how to make existing stocks of goods render the maximum possible period of service. Third, the upward pressure on prices will grow before it diminishes; numerous indications point to the likelihood of a strong upsurge of prices of goods at the retail stage in the closing months of 1941, unless forceful measures are adopted by the Government agencies responsible for controlling such a development.

A final conclusion might be that the present period should favor the expansion of many of the service industries, notably domestic service, medical, and entertainment and recreation.

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Job-Breakdown and Worker Training.

Widespread inability to obtain necessary labor despite extensive unemployment would be a paradox contrary to all previous experience with the processes of economic expansion. Actually, the unemployed labor force will continue an important source of additional workers for defense industries, even though unemployed reserves of skilled and semiskilled labor suitable for defense manufacturing appear to be meager. The essential problem is one of skill requirements, and these can be reduced in a manner permitting a considerable part of the unemployed to be absorbed into defense plants, if needed.

Manufacturing processes are, to a considerable extent, adaptable to the skill characteristics of available labor. Thus, a complex process calling for a highly skilled worker can, as a rule, be broken down into a succession of simple processes requiring only a limited degree of labor skill readily acquired by previously unskilled workers. This procedure, known as "job-breakdown," "down-processing" or "dilution," has long been a feature of the technical evolution of large-scale industries.

Present skill requirements of the defense industries reflect, in many instances, production methods developed on a small scale under past conditions of labor supply offering large numbers of highly skilled workers. These production methods are now being modified, and can be modified still further, in keeping with changed conditions of labor supply, as the defense industries expand their scale of output. To assist in this, the Labor Division of the Office of Production Management is undertaking to break down any defense production process for which skilled workers cannot be found, into units of labor skill that can be acquired by previously unskilled workers in a very short period of training. Such training has been provided to more than 1 million workers during the past year and double this number are expected to be enrolled in training programs over the coming year.

Given an adequate program of worker training, the effect of job-breakdown, which is equally adapted to nondefense plants, will be to make the unemployed (unskilled) labor force a fully effective source of supply for competent defense, as well as nondefense workers. It is possible, of course, due to lack of management initiative in breaking down job requirements in defense plants, or to time factors and frictions involved, that the defense industries may still need to draw some skilled workers from nondefense employment to an extent greater than the shift which will occur because of curtailment of civilian output in durable lines. However, the result would be merely to shift to nondefense industries a part of the task of assimilating unemployed labor into the employed working force. So long as the unemployed labor force remains adequate—and it appears that it will be so through 1942—such labor shortages as may develop should prove, in the main, to be temporary and localized.